

# EVOLUTION® 6000 Basic Thermal Imaging Camera

## Product Specification



### I. Purpose

To establish minimum standards for the MSA EVOLUTION 6000 Thermal Imaging Camera (TIC) and EVOLUTION 6000 TIC battery charging systems. EVOLUTION 6000 TICs are tools for firefighters and first response emergency personnel that are used for search and rescue, fire scene size-up, overhaul, location of victims, and advanced firefighting and first response applications.

### II. Type

The thermal imaging camera covered by this specification shall be of the type incorporating a 320X240 vanadium oxide microbolometer focal plane array sensor. EVOLUTION 6000 Series TIC displays black and white scene representations on a 3.5" diagonal LCD display. Design is optimized for firefighters in ergonomic design and ease of incorporation with firefighting gear. TIC features dual-handle design for easy handoff and handling, and high-impact, heat-resistant housing to ensure that the TIC will withstand rigors of firefighting environments. The TIC is further protected by a rubber bumper system to provide additional protection from extremely harsh environments. The TIC shall be tested to and comply with the following standards:

<b>NFPA COMPLIANCE</b>	NFPA 1801, 2018 Edition
<b>WATER/DUST INGRESS</b>	International Standard CEI, IEC 529, IP67 Classification
<b>DIRECT FLAME/HEAT EXPOSURE</b>	NFPA 1801-2018 Edition
<b>RADIO FREQUENCY INTERFERENCE</b>	IEC 61000-6-3, IEC 61000-6-2, FCC Part 15
<b>ROLLOVER (TRUCK CHARGER)</b>	Simulated NFPA 1901-12, 1.7
<b>NON-EXPLOSIVE RATING</b>	ANSI/UL 12.12.01 (Class I, Div. 2, Groups C and D)

### III. Component Parts

The product shall consist of the following component parts. TICs, kits and accessories can be purchased individually.

1. EVOLUTION 6000 Thermal Imaging Camera
2. Direct temperature measurement
3. Heat Seeker PLUS Indicator
4. Flashlight
5. Laser pointer

**Components below are sold in kit format and/or individually:**

6. Lithium-ion battery packs
7. Desktop/vehicle cupholder dual battery charger with wall plug and cigarette lighter adapter
8. Truck-mounted charging system
9. Attachments: carabiner, wrist strap, shoulder strap, retractable lanyard
10. Carrying case



**WHEN YOU GO IN, WE GO IN WITH YOU.**

# EVOLUTION 6000 Basic TIC Product Specs

## IV. Specific Requirements

### 1. EVOLUTION 6000 Basic TIC

<b>SENSOR:</b> TYPE ARRAY SIZE SPECTRAL RESPONSE NETD DYNAMIC RANGE VIDEO STANDARD FRAME RATE VIDEO OUTPUT	Uncooled vanadium oxide microbolometer focal plane array detector 320X240 7.0-14.0 microns ≤78mK (.078°C) max. ≤40mK (.040°C) typ. (in High Sensitivity), ≤234mK (.234°C) (in Low Sensitivity) -40° to 320°F (-40° to 160°C) (in High Sensitivity), -40°F to 1112°F, (-40°C to 600°C) (in Low Sensitivity) BT-656 digital 60 Hz .mv4 (.mpeg4)
<b>MECHANICAL:</b> DIMENSIONS BASE WEIGHT MATERIALS OUTER HOUSING RUBBER BUMPERS DISPLAY COVER BUOYANCY	7.3" x 4.8" x 11.6" (185 mm x 122 mm x 295 mm) 42.4 oz. (2.65 lbs/1.2 kg) Outer case and bumper materials pass NFPA 1801,2013 Edition direct flame and heat exposure tests Polyphenylsulfone Flame-retardant silicone UV-stabilized polycarbonate with NFPA anti-scratch coating Camera floats in water
<b>ELECTRICAL:</b> POWER SUPPLY POWER CONSUMPTION USB PORTS DISPLAY	Supplied by integral battery pack <6 W nominal 1 configuration port (E6000, E6000+), 1 configuration, 1 video/image download port (E6000X) 3.5" LCD backlit display
<b>ENVIRONMENTAL</b> <b>AMBIENT TEMP:</b> 80° C, 176° F 120° C, 248° F 260° C, 500° F -30° C, -22° F -40° C, -40° F	<b>OPERATING TIME:</b> > 30 minutes > 20 minutes > 6 minutes > 40 minutes > 25 minutes
<b>WATER/DUST INGRESS:</b>	TIC shall resist dust and water and must conform to International Standard CEI IEC 529; Degrees of Protection Provided by Enclosures (IP Code); IP67 classification
<b>IMPACT/DROP:</b>	Will survive 6-ft (2-m) drop at any angle with no operational defaults or physical compromise of outer housing.
<b>RFI/EMC:</b>	TIC should not interfere with standard firefighter frequency bands at power levels found in hand-held (3-5W) and vehicle-mounted systems (~100W). Communication/electronic devices cannot affect TIC to the point where navigation is compromised when TIC is subjected to RF interference of 80 MHz to 1 GHz at 30V/m. TIC must meet RFI emissions and susceptibility of IEC
<b>OPTICAL:</b> LENS FIELD OF VIEW FOCUS	9mm, F1.25 48° horizontal, 37° vertical Optimal 3 ft to ∞ (1m to ∞)
<b>BATTERY STATUS:</b> 4 GREEN 3 GREEN 2 YELLOW 1 RED 1 RED (FLASHING) SHUTTER INDICATOR LOW SENSITIVITY INDICATOR	Total battery capacity will be indicated in viewing area with row of 4 LEDs, functioning as follows: 75% to 100% capacity 50% to 75% capacity 25% to 50% capacity Less than 25% capacity Less than 5 minutes remaining On-screen indicator appearing as small block in upper left display corner when camera shutters indicates that area re-scan is necessary On-screen indicator appearing as green triangle in upper left display indicates activities when TIC is in Low Sensitivity
<b>OVER-TEMPERATURE WARNING:</b> NOT LIT FLASHING RED	On-screen red triangle in display's upper center TIC is within operational thermal limits TIC has exceeded recommended operational thermal limits

## 2. Rechargeable Lithium-Ion Battery Pack

<b>BATTERY TYPE:</b>	Rechargeable lithium-ion battery pack
<b>BATTERY LOCATION:</b>	Inside handle
<b>BATTERY WEIGHT:</b>	3.2 oz. (90.7 g)
<b>OPERATING TIME:</b>	3.5 hours nominal, 4 hours maximum

## 3. Stand-Alone Battery Charger

<b>FUNCTIONALITY:</b>	Stand-alone battery charger will charge two batteries simultaneously. Charger design allows for desktop or vehicle cup holder use
<b>BATTERY CHARGE TIME:</b>	4 hours nominal, trickle maintenance charge
<b>POWER SUPPLY:</b>	110/240VAC 50/60Hz power supply 12 VDC cigarette adapter included

## 4. EVOLUTION 6000 Series TIC Vehicle-Mounted Charger

<b>FUNCTIONALITY:</b>	Optional vehicle-mounted charger will charge TIC and 1 spare battery when properly installed Each vehicle charger includes installation/mounting kit. Charger will draw less than 1.5 amps of power												
<b>BATTERY CHARGE TIME:</b>	4 hours nominal, trickle maintenance charge												
<b>POWER SUPPLY:</b>	12-24 VDC												
<b>VIBRATION:</b>	Vehicle-mounted charger must safely charge TIC while in a moving vehicle												
<b>ROLLOVER:</b>	Vehicle-mounted charger must meet rollover requirements identified in 1901-12, 1.7												
<b>LED INDICATORS:</b>	<table border="0"> <tr> <td>CAMERA CHARGING INDICATOR</td> <td>On camera front panel</td> </tr> <tr> <td>    RED</td> <td>Charging</td> </tr> <tr> <td>    GREEN</td> <td>Complete</td> </tr> <tr> <td>SPARE BATTERY CHARGING INDICATOR</td> <td>On charger</td> </tr> <tr> <td>    RED</td> <td>Charging</td> </tr> <tr> <td>    GREEN</td> <td>Complete</td> </tr> </table>	CAMERA CHARGING INDICATOR	On camera front panel	RED	Charging	GREEN	Complete	SPARE BATTERY CHARGING INDICATOR	On charger	RED	Charging	GREEN	Complete
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<b>DIMENSIONS:</b>	10.375" L, 5.75"W, 6"H (264mm x 146mm x 152mm)												

## 5. Attachments and Carrying Options

<b>CARABINER:</b>	Each TIC shall come equipped with 3 carabiner attachment points and carabiner for securing TIC to tool belt or other gear
<b>WRIST STRAP/BUNKER CLIP:</b>	Optional wrist strap/bunker clip attachment is available, constructed of fire- and heat-resistant materials
<b>SHOULDER STRAP:</b>	Optional flame- and heat-resistant shoulder strap is available, includes emergency release clip
<b>RETRACTABLE LANYARD:</b>	Optional retractable lanyard for use with TIC/carabiner assembly is available. Retraction line is to be made of Kevlar core material, housing is to be heat-resistant

## 6. Carrying Case

<b>CONTENTS:</b>	Case will hold as minimum: TIC, 2 lithium-ion battery packs, manual, carrying attachments, and stand-alone battery charger assembly
<b>WATER/DUST INGRESS:</b>	Case shall resist dust and water ingress and must conform to International Standard CEI IEC 529; Degrees of Protection Provided by Enclosures (IP Code); IP54 classification
<b>IMPACT/DROP:</b>	Dropped 3 consecutive times onto concrete from 3 ft (1m) at any angle with no operational defects or physical compromise of case or contents

## 7. Operation and Instruction Manual

<b>USER INSTRUCTIONS:</b>	Comprehensive manual includes all aspects of use, care and camera maintenance
<b>QUICK-START GUIDE:</b>	Easy reference card covers basic camera operation
<b>TRAINING VIDEO:</b>	Online video training includes camera use, care and maintenance, with available certification

## 8. Direct Temperature Measurement

<b>INSTALLATION:</b>	Integrated inside TIC without add-on devices
<b>DEVICE:</b>	Measurement taken from FPA
<b>RANGE:</b>	-40° to 320°F (-40° to 160°C) in High Sensitivity, -40°F to 1112°F, (-40°C to 600°C) in Low Sensitivity
<b>TICK MARKS:</b>	75°F, 150°F and 225°F (24°C, 65°C and 107°C) in High Sensitivity; 250°F, 500°F and 750°F (120°C, 260°C and 399°C) in Low Sensitivity
<b>ACCURACY:</b>	± 18°F (10°C) or ±10% whichever is greater. For temperatures greater than 435°F (225°C) ± 20%
<b>READOUT:</b>	Thermometer-style bar indicator in Fahrenheit or Celsius Digital temperature feature displays approximate number value of object temperatures located in spotter

## 9. Heat Seeker PLUS Indicator

<b>INSTALLATION:</b>	Integrated inside TIC without add-on devices
<b>DEVICE:</b>	Measurement taken from FPA
<b>READOUT:</b>	Graduated color (yellow to orange to red) for portions of scene that are above 275°F, (135°C)-yellow, 297°F (147°C)-red, in High Sensitivity, or 842°F (450°C)-yellow, 914°F, (490°C)-red, in Low Sensitivity mode

## 10. Flashlight

<b>INSTALLATION:</b>	Integrated inside TIC without add-on devices
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## 11. Laser Pointer

<b>INSTALLATION:</b>	Integrated inside TIC without add-on devices
<b>EFFECTIVE DISTANCE:</b>	200 ft (61m)

Note: This Bulletin contains only a general description of the products shown. While product uses and performance capabilities are generally described, the products shall not, under any circumstances, be used by untrained or unqualified individuals. The products shall not be used until the product instructions/user manual, which contains detailed information concerning the proper use and care of the products, including any warnings or cautions, have been thoroughly read and understood. Specifications are subject to change without prior notice.

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